Before The

Federal Trade Commission

CIGARETTES AND RELATED MATTERS

Methods To Be Employed in Determining Tar and Nicotine Content

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ADDITIONAL OBSERVATIONS FOLLOWING THE "REPORT OF TAR AND NICOTINE CONTENT OF THE SMOKE OF 59 VARIETIES OF CIGARETTES" OF NOVEMBER 20, 1967

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To the Honorable Commissioners:

The undersigned, on January 9, 1968, filed with the Commission *"An Analysis of the Federal Trade Commission's 'Report of Tar and Nicotine Content of the Smoke of 59 Varieties of Cigarettes' of November 20, 1967."* In that Analysis the Commission's report of November 20, 1967 was evaluated and recommendations offered for modifications in the Commission testing procedure based upon an analysis of the Commission test results in the light of industry knowledge and experience.

Since that date, the Tobacco Institute Testing Laboratory ("TITL") has completed identical tests on the 59 varieties of cigarettes tested by the Commission; and TITL has made additional tests on these varieties in accordance with the methodology repeatedly recommended to the Commission, but rejected by it. The results of the TITL's testing underscore the recommendations made in the Analysis filed on January 9, 1968, and previously made in five different written submissions to the Commission.[1] In a further effort to cooperate with the Commission in its testing of cigarettes for "tar" and nicotine content, the following additional data and observations based upon the results of TITL are submitted for the Commission's consideration.

[1] These written recommendations were submitted to the Commission on August 5, 1966, September 9, 1966, November 28, 1966, December 20, 1966 and April 10, 1967.

PM3000886798

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Introduction

Notwithstanding the absence of any evidence that low "tar" and nicotine are related in any way to smoking and health, the Tobacco Institute Testing Laboratory (TITL) was organized by the Tobacco Institute following the announcement by the Commission that the Commission was establishing its own laboratory for the purpose of measuring the "tar" and nicotine content of cigarette smoke. TITL was established because this type of testing involves complex scientific procedures which are highly susceptible to error. TITL's objective was to utilize industry experience in connection with the technical problems raised by the Commission testing program and cooperatively to assist the Commission in the formation and operation of the Commission laboratory and the training of its testing personnel.

Four of the Commissioners visited TITL prior to the inception of the Commission's testing, and industry research personnel from TITL have continually been available for consultation with the testing staff of the Commission laboratory.

In accordance with a separate collection contract, made known to the Commission, Western Union delivered to TITL a duplicate sample of 100 packages of each of the 59 varieties first tested by the Commission. This sample had been picked up at the same times and places and in the same amounts as the Commission's sample.

Utilizing this sample, TITL *first* tested 100 cigarettes of each of the 59 varieties in accordance with the methodology adopted by the Commission on July 31, 1967. TITL then ran a *second* series of tests on these varieties following the methodology recommended to the Commission by the undersigned on November 28, 1966.[2] This second testing methodology (hereafter referred to as the "industry methodology") differs from the Commission methodology in two respects: the sample size tested; and the butt length to which cigarettes tested are smoked. First, 200 cigarettes of each variety are tested in the industry methodology rather than the smaller sample of 100 cigarettes of each variety smoked in the Commission methodology. Second, in the industry methodology, cigarettes are smoked to a butt length of 30 mm. in contrast with the Commission's methodology in which cigarettes are smoked to a butt length of 23 mm.[3]

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[2] With minor modifications, this industry recommended methodology was published in the September 1967 Virginia Journal of Science.

[3] In the case of filter cigarettes, the cigarettes are smoked to the designated butt length, either 30 mm. or 23 mm., or to 3 mm. beyond the tipping paper (filter overwrap), whichever is longer.

PM3000886799

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It is unnecessary to rehearse again the scientific and statistical considerations which demonstrate the need for a sample size of at least 200 cigarettes of each variety and a butt length of 30 mm.[4] Instead, the purpose of this memorandum is to give the Commission the striking results of this second TITL test, insofar as those results relate to the methodology being followed by the Commission.

It is hoped that on the basis of these TITL test results, as well as the Commission's initial test results, the Commission will realize the necessity for altering its testing procedure.

The Precision of Test Results

A "tar" or nicotine value for a variety of cigarette can only be expressed as an interval. Thus, where a variety has an obtained "tar" value of 20.0 ± 0.6 mg., the most that can be said is that there is a 95% chance that the true mean or average "tar" value based upon the sample tested of that variety lies somewhere between 19.4 mg. and 20.6 mg. Based upon these results, no one can assert with the designated 95% confidence that the estimate of the true mean value is not 19.4 or 20.6 rather than 20.0. The true mean value can in fact on this sample be at any point between 19.4 mg. and 20.6 mg.

The difference between 20.6 and 19.4, which is 1.2, in the cited example, is the confidence interval or the spread in the value derived in testing. One half of this confidence interval, amounting to 0.6 mg. in the cited example, is hereafter referred to as the error (E). This term (E) is a measure of the precision of the value given as 20.0 in this example. Thus, a value of 20.0 ± 0.4 mg. is more precise than a value of 20.0 ± 0.8 mg. One needs no statistical training to recognize that greater precision is preferable because it permits a better estimate of the true mean value with the given level of confidence—95% in this instance. It is also apparent that the precision of test results obtained will depend upon the methodology employed.

The Commission's report of the "tar" and nicotine content of the smoke of 59 varieties of cigarettes of November 20, 1967, was based upon testing by the Commission laboratory in accordance with the Commission methodology. In this report 35 of the 59 varieties had values for (E) *greater* than .5, and 24 varieties had value for (E) equal to or greater than .7. TITL obtained a similar lack of precision in its test of 100 cigarettes of the identical 59 varieties in following

[4] See the Analysis filed on January 9, 1968, the Supplemental Observations of December 20, 1966, and Technical Data and Recommendations of November 28, 1966.

PM3000886800

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the Commission methodology, thereby demonstrating that the Commission methodology is simply incapable of producing the required precision. The following table indicates the frequency distribution of (E)'s, which is a measure of the precision, in the testing of the 59 varieties, both by the Commission and by TITL in following the Commission methodology which tests only 100 cigarettes of each variety.

TABLE I

(E) or Error	Testing by FTC Using FTC Methodology	Testing by TITL Using FTC Methodology
.1		
.2		1
.3	2	
.4	11	6
.5	11	15
.6	11	13
.7	8	8
.8	5	5
.9	5	1
1.0	1	3
1.1	1	2
1.2		1
1.3	2	1
1.4	1	1
1.5		
1.6		2
2.5	1	

The Required Sample Size and Butt Length

This first table, Table I, clearly demonstrates that the methodology adopted by the Commission is plainly inadequate to achieve the desired precision. Elementary logic as well as scientific principles require that in order for results to be reported to the nearest whole mg., the error cannot exceed 0.5 mg. Indeed, an argument can be made for even a tighter tolerance.[5]

As previously pointed out—and plainly shown in Table I—in the Commission's reported results the error for 35 out of the 59 values exceeded 0.5, and TITL's precision in testing under the Commission methodology was approximately the same. The conclusion is inescapable that regardless of how

[5] See the submission by Dr. Herbert Arkin of November 28, 1966.

PM3000886801

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proficient Commission personnel become in its laboratory, the Commission's methodology is incapable of producing results with the desired precision.

In contrast, when TITL tested 200 cigarettes of 54 of the 59 varieties,[6] following the industry methodology which requires smoking to a 30 mm. butt length, the error for only three of the varieties tested exceeded 0.5 mg., and the error for those three varieties was 0.6 mg. The following table compares the frequency of the various (E)'s in the testing of 54 varieties by TITL following the Commission methodology and the industry methodology.

TABLE II

(E) or Error	Testing by TITL Using FTC Methodology	Testing by TITL Using Industry Methodology
.1		
.2	1	9
.3		22
.4	6	14
.5	12	6
.6	13	3
.7	8	
.8	3	
.9	1	
1.0	3	
1.1	2	
1.2	1	
1.3	1	
1.4	1	
1.5		
1.6	2	

This comparison of the frequency of errors in results obtained by TITL's testing in accordance with the Commission methodology and the industry methodology is indeed striking. There can no longer be any doubt as to the increased and necessary precision obtained by testing in accordance with the industry methodology, and that this precision is thus alone obtained by this industry methodology.

[6] Five of the 59 varieties designated by the Commission included two types of filters where this could be ascertained from the packages of the cigarettes of these varieties. Accordingly, no comparison of the precision of the two methodologies is made on the basis of the results for those 5 varieties, and the comparison of precision is limited to the results for 54 varieties.

PM3000886802

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It is difficult at the present time precisely to state how much of this increased precision was due to using a 200 cigarette sample size and how much was due to smoking cigarettes tested to a 30 mm. butt length. However, a careful analysis of the TITL test results indicates that TITL was able to achieve this higher degree of precision in its tests conducted in accordance with the industry methodology both because 200 cigarettes of each variety were tested and because cigarettes were smoked to a 30 mm. butt length—the two differences between the industry recommended and the Commission adopted methodology.

We still insist that the great majority of American smokers smoke to 30 mm., and this alone should lead the Commission to smoke cigarettes being tested to a 30 mm. butt length. In addition, it is now indicated that the smoking of cigarettes tested to 30 mm. can be expected to contribute to the necessary and reliable precision in the test results.

In reasserting the necessity for a larger sample size and a 30 mm. butt length, we are not merely quibbling with the Commission about academic matters. There is a considerable difference between the rankings reported by the Commission utilizing its methodology and the comparable rankings obtained from the TITL data based upon testing in accordance with the industry methodology. For example, one variety ranked 14 places lower in "tar" under the industry methodology than that variety ranked as reported by the Commission; and two other varieties ranked 13 places lower under the industry methodology. At the other end of the scale, one variety ranked 18 places higher in "tar" under the industry methodology than that variety ranked as reported by the Commission; another ranked 17 places higher; and other varieties ranked 16 and 10 places higher, respectively, under the industry methodology. The materiality of the differences in rankings achieved by the two methodologies demonstrates that the Commission's decision to ignore a demonstrated, scientifically required methodology leads not to trivial differences but substantially misleads the public.

Reporting of Results

With regard to reporting of test results, a review of the errors (E)'s obtained in the Commission and TITL results, set forth above, indicates that the Commission is not even warranted in reporting to the public "tar" to the nearest mg., and certainly not to the nearest 1/10th mg. as previously reported

PM3000886803

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by the Commission.[7] These errors in the Commission results do not even remotely approach the .05 needed to justify reporting to the nearest 1/10th mg. Indeed, it is quite impracticable to achieve such minute errors in tests conducted in accordance with the Ogg methodology or any variation of that methodology.

If the Commission follows the industry recommended methodology, it must round off all values for "tar" to the nearest whole mg. The Commission will then find several varieties which have the same "tar" value. Since no valid difference has been established between "tar" values for these varieties, basic fairness and cognizance of unwarranted competitive effects require that the Commission not rank such varieties in any order relative to each other. This can only mislead consumers into believing that differences have been established between such varieties. Instead, it is recommended that the Commission group for purposes of reporting such varieties and list them alphabetically across the page. Thus, for example, the Commission chart, where Varieties C and D had the same "tar" value, would have the following form:

RANKINGS

1. Variety A
2. Variety B
3. Variety C, Variety D
4. Variety E

The TITL test results also support the previous recommendation that test results should be reported both on a per puff and a per cigarette basis. Rankings by average "tar" per puff differ considerably from rankings by "tar" per cigarette under both the Commission and the industry methodologies. Giving consumers only per cigarette and not per puff values is demonstrably misleading to the great majority of smokers whose smoking habits do not follow the smoking machine parameters and who alone know their individual smoking habits.

Conclusion

This analysis of TITL's test results demonstrates beyond any doubt the inadequacy of the methodology adopted by the Commission. Had the Commission instead followed the methodology recommended by the undersigned, including testing 200 cigarettes of each variety and smoking cigarettes to a

[7] A similar analysis can be made for nicotine which the Commission reported to the nearest 1/100th mg. but, which should only be reported to the nearest 1/10th mg.

PM3000886804

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butt length of 30 mm., and had the Commission reported "tar" to the nearest whole mg. and nicotine to the nearest .1 mg., the Commission results would not have been subject to the valid scientific criticism raised in our Analysis filed on January 9, 1968, and Dr. Herbert Arkin's letter of December 18, 1967.

The recent Commission pickup of 79 additional varieties to be tested and the Commission's current testing of these varieties make it imperative that the Commission promptly adopt the modifications in its testing procedure, and paramountly in its reporting, recommended in the Analysis filed on January 9, 1968, and underscored in these Additional Observations.

Many of these additional varieties to be tested are slower moving varieties. Accordingly, some are not available at all of the pickup points, and some may have been on shelves longer than the 59 varieties previously tested. All of these factors suggest that the Commission may encounter even more difficult problems in testing these additional varieties than it encountered in testing the previous 59 varieties. These problems will undoubtedly result in a reduced precision in the reported results and will subject the Commission to still further scientific criticism unless it modifies its procedures and reporting in the manner recommended.

Respectfully submitted,

THE AMERICAN TOBACCO COMPANY
/s/ CYRIL F. HETSKO

BROWN & WILLIAMSON TOBACCO CORPORATION
/s/ ADDISON Y. YEAMAN

LIGGETT & MYERS TOBACCO COMPANY
/s/ FREDERICK P. HAAS

PHILIP MORRIS INCORPORATED
/s/ PAUL D. SMITH

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/s/ H. HENRY RAMM

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